

Dual N-channel Enhancement Mode Power MOSFET

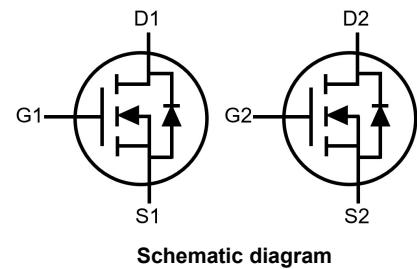
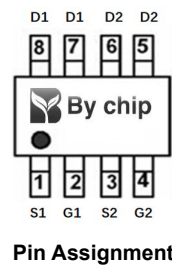
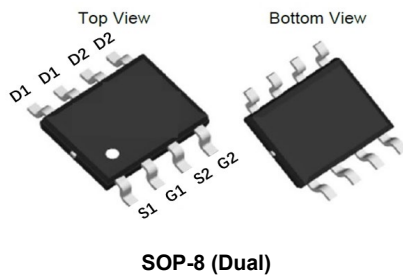
Features

- $V_{DS} = 30V$, $I_D = 12A$
 $R_{DS(ON)} < 9\text{ m}\Omega$ @ $V_{GS} = 10V$
 $R_{DS(ON)} < 13\text{ m}\Omega$ @ $V_{GS} = 4.5V$

General Features

- Advanced Trench Technology
- Provide Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free and Green Available

100% UIS TESTED!
 100% ΔV_{ds} TESTED!



Absolute Maximum Ratings ($T_c = 25^\circ\text{C}$ unless otherwise specified)

| Symbol | Parameter | Max. | Units |
|-----------------|---|---------------------------|---------------------------|
| V_{DSS} | Drain-Source Voltage | 30 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current | $T_A = 25^\circ\text{C}$ | 12 |
| | | $T_A = 100^\circ\text{C}$ | 8 |
| I_{DM} | Pulsed Drain Current ^{note1} | 48 | A |
| E_{AS} | Single Pulsed Avalanche Energy ^{note2} | 16 | mJ |
| P_D | Power Dissipation | $T_A = 25^\circ\text{C}$ | 3 |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 46 | $^\circ\text{C}/\text{W}$ |
| T_J, T_{STG} | Operating and Storage Temperature Range | -55 to +150 | $^\circ\text{C}$ |

Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|---|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=30V, V_{GS}=0V,$ | - | - | 1.0 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS}=\pm 20V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance <small>note3</small> | $V_{GS}=10V, I_D=12A$ | - | | 9 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | - | | 13 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=15V, V_{GS}=0V,$ $f=1.0MHz$ | - | 1011 | - | pF |
| C_{oss} | Output Capacitance | | - | 142 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 119 | - | pF |
| Q_g | Total Gate Charge | $V_{DS}=15V, I_D=10A,$ $V_{GS}=10V$ | - | 19 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 6.3 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 4.5 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DS}=15V,$ $I_D=6A, R_{GEN}=3\Omega,$ $V_{GS}=10V$ | - | 6 | - | ns |
| t_r | Turn-on Rise Time | | - | 5 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 25 | - | ns |
| t_f | Turn-off Fall Time | | - | 7 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 12 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 48 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S=12A$ | - | - | 1.2 | V |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F=10A, di/dt=100A/\mu s$ | - | 7 | - | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | | - | 6.3 | - | nC |

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{GS}=10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=11.5A$
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Performance Characteristics

Figure 1: Output Characteristics

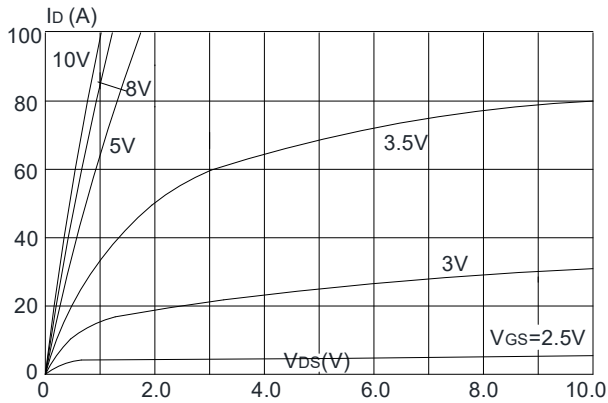


Figure 2: Typical Transfer Characteristics

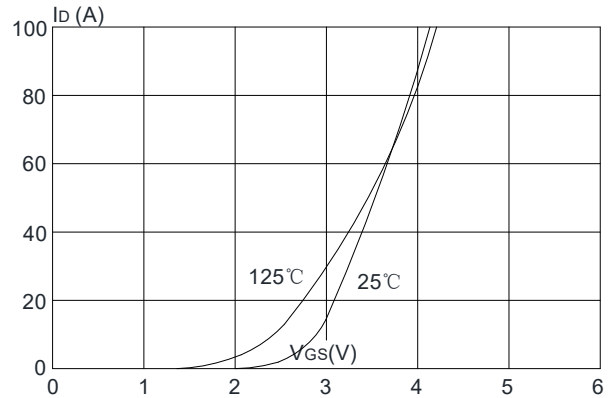


Figure 3: On-resistance vs. Drain Current

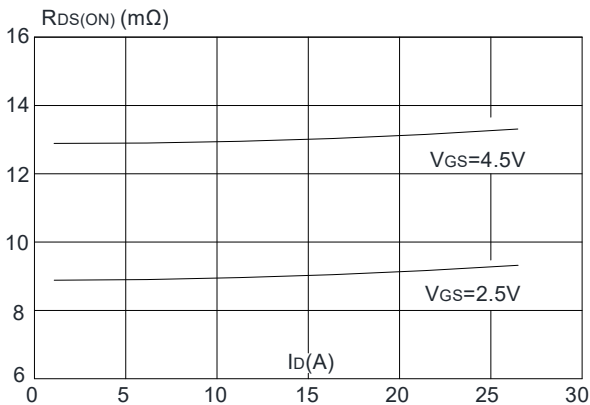


Figure 4: Body Diode Characteristics

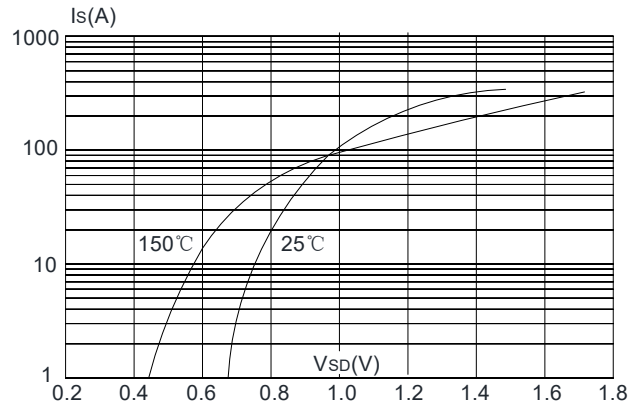


Figure 5: Gate Charge Characteristics

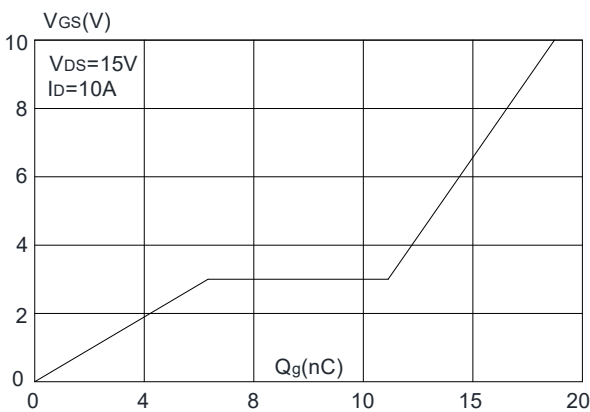


Figure 6: Capacitance Characteristics

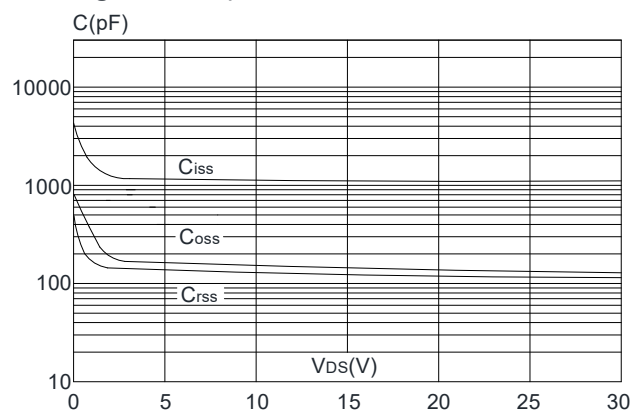


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

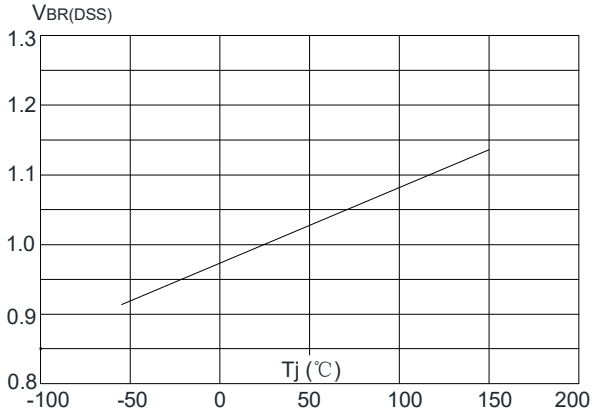


Figure 8: Normalized on Resistance vs. Junction Temperature

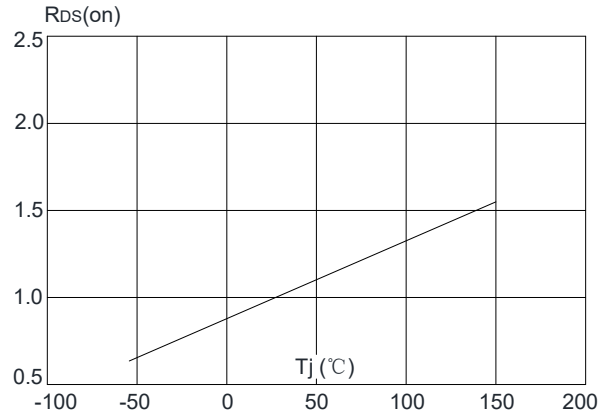


Figure 9: Maximum Safe Operating Area

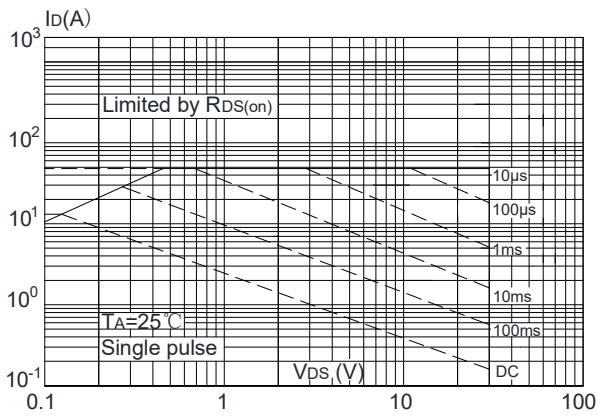


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

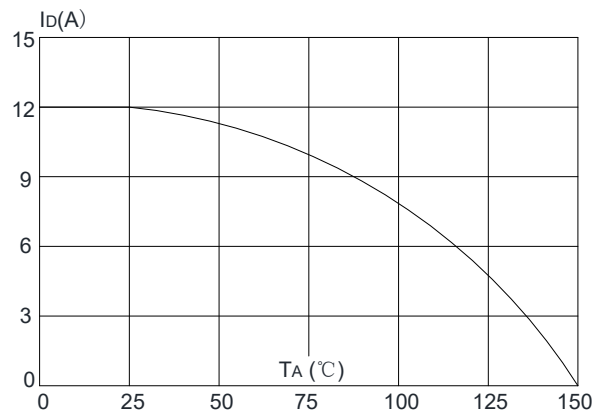
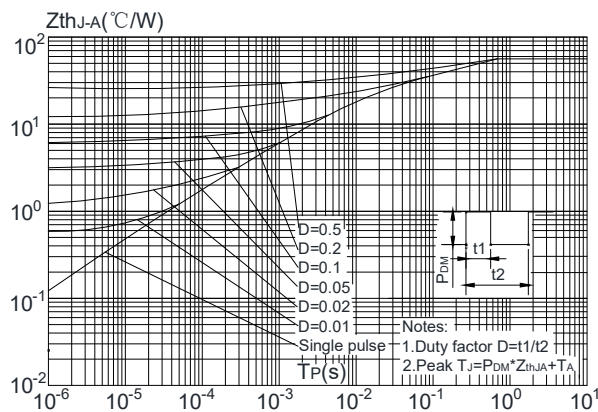


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



Test Circuit

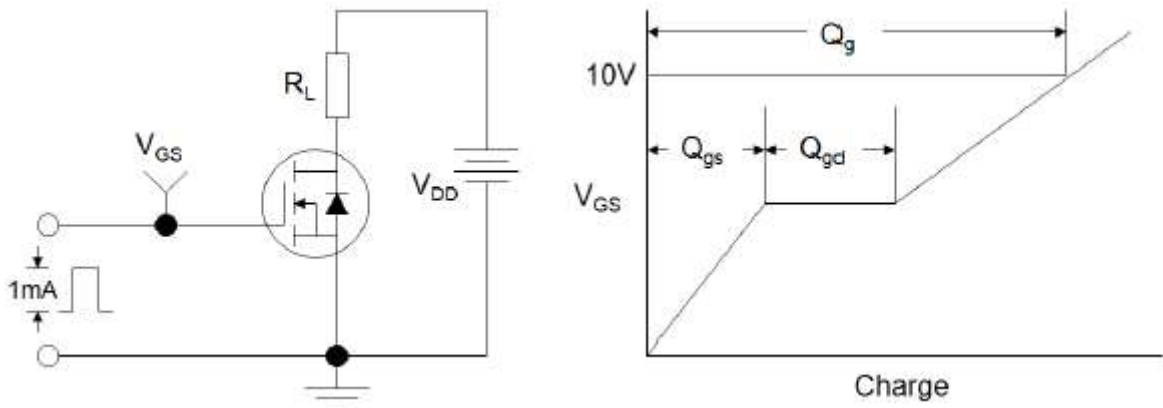


Figure1:Gate Charge Test Circuit & Waveform

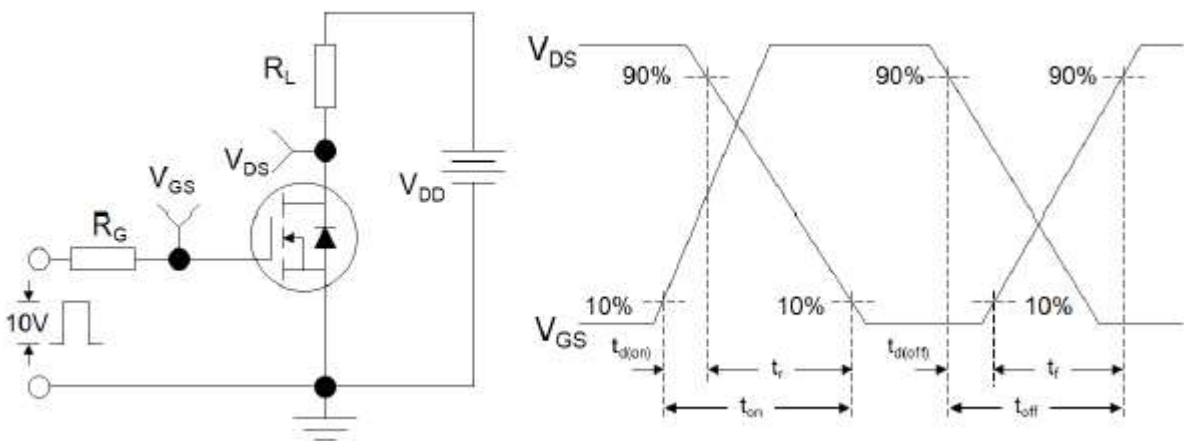


Figure 2: Resistive Switching Test Circuit & Waveforms

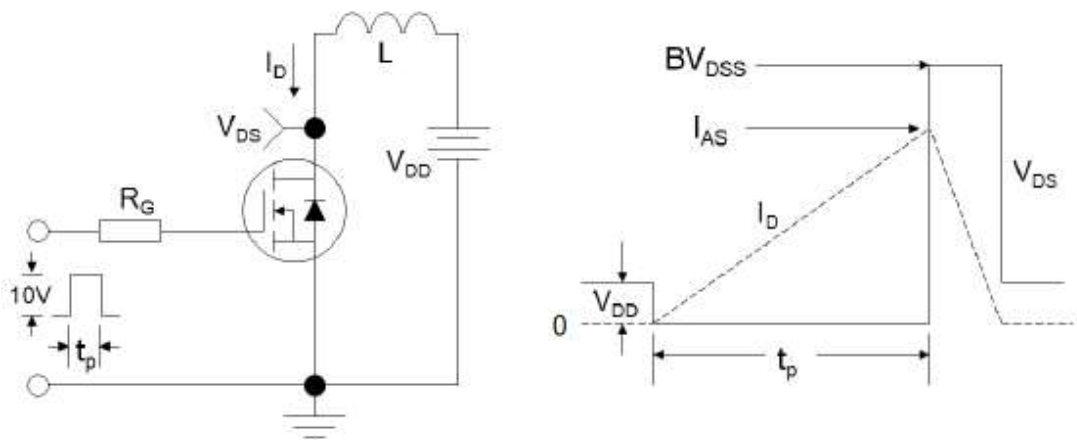


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms